An interim application was considered by the commissioners at their meeting held on March 15, when it was resolved:—

(*a*) To recommend an advance of a sum not exceeding 4000*l.* for the purchase of a dredger, on the production of satisfactory tenders for the approval of the commissioners.

(*b*) To postpone consideration of the application in respect of Ballinagoul until the next meeting, for the production of plans of the proposed works.

Summary and Conclusion.

It will be gathered from this brief review of their action that during the first nine months of their operations the commissioners (and also, they believe, the Government departments most concerned with the Development Fund) have been largely occupied in necessary preliminary work. Although they have received under the Act but a small proportion of the applications actually made to the Treasury, yet it must be remembered that the settlement of a comprehensive scheme for such a purpose as agricultural research is in practice equivalent to disposing of many individual applications; and for reasons already stated, that procedure, though apparently slow, is, in the commissioners' view, the only ultimately satisfactory method of dealing with schemes for several at least of the purposes mentioned in the Act.

The sums of which the commissioners have either recommended the allocation, or agreed to recommend it so soon as satisfactory schemes are framed, amount roughly to 165,000*l.* per annum, and 100,000*l.* non-recurring advances. By far the larger proportion of this expenditure, if ultimately approved by the Treasury, will go in agricultural research and instruction, viz. England and Wales 105,000*l.* per annum, Scotland a lump sum of 60,000*l.* and 5000*l.* per annum, Ireland 9000*l.* per annum.

These figures do not take account of the considerable sums, of which no definite estimate can yet be given, but for which schemes were either being prepared or were under examination by the commissioners at the close of the year, *e.g.* forestry in England and Wales, the purchase of a demonstration area in Scotland and the establishment there of a central school of forestry, the development of Irish fisheries and fishery harbours, and the encouragement of the organisation of cooperation throughout the United Kingdom. Nor do they take account of applications which had not reached the commissioners, though known as having been made, or about to be made, to the Treasury—as, for instance, schemes for the development and improvement of British fisheries and of Scotch harbours; nor, again, of possible expenditure on such projects as the revival of the flax and hemp industries, the encouragement of tobacco and beet cultivation, or the establishment of an institution for the study of rural economics.

In the first nine months of their work the commissioners, so far as they are concerned, have allocated and, as they think, rightly allocated, one-third of the annual income guaranteed to the Development Fund for five years. Out of the two-thirds which now remain they hope to provide during the coming year for considerable annual expenditure on such purposes as forestry and forestry instruction and the organisation of cooperation; and it cannot be supposed that expenditure on the purposes with which they have already dealt ought to or will remain stationary at the amounts provisionally fixed. Looking to these facts, they cannot but feel some apprehension that unless Parliament comes to the aid of the fund its position in a very few years will not be a strong one. They will, however, be far more able to form an opinion on this important question at the end of the financial year 1911–12, by which time they hope that all the applications hitherto made to the Treasury will have reached them from the Government departments, that considerable schemes known to be in preparation will have been submitted, and that the inquiries which they are making into such subjects as flax, hemp, and tobacco cultivation will have been completed, or be on the point of completion.

NOTES.

On Saturday last, July 22, nineteen aëroplanes started from Brooklands, near Weybridge, in a race for which a prize of 10,000*l.* was offered by *The Daily Mail.* The specified route was a circuit of Great Britain, with a number of landing-places, or control stations, at each of which a descent had to be made; these places, with their distances in miles from one another, were:—Brooklands to Hendon, 20; Hendon to Harrogate, 182; Harrogate to Newcastle, 68; Newcastle to Edinburgh, 93; Edinburgh to Stirling, 31; Stirling to Glasgow, 22; Glasgow to Carlisle, 86; Carlisle to Manchester, 103; Manchester to Bristol, 141; Bristol to Exeter, 65; Exeter to Salisbury Plain, 83; Salisbury Plain to Brighton, 76; Brighton to Brooklands, 40; total distance, 1010 miles. The first section of the race was covered by J. Védrines in 19m. 48s., and ten other airmen accomplished the journey in less than half an hour. On Monday morning the following machines and pilots started from Hendon for Edinburgh, with official control descents at Harrogate and Newcastle:—J. Védrines, Morane-Borel monoplane; Lieut. Conneau ("Beaumont"), Blériot monoplane; J. Valentine, Deperdussin monoplane; G. W. Hamel, Blériot monoplane; S. F. Cody, Cody biplane; H. J. D. Astley, Birdling monoplane; C. Howard Pixton, Bristol biplane; Lieut. R. A. Cammell, R.E., Blériot monoplane; O. de Montalent, Bréguet biplane; C. T. Weymann, Nieuport monoplane; C. P. Pizey, Bristol biplane; G. Blanchet, Bréguet biplane; B. C. Hucks, Blackburn monoplane; Lieut. H. Bier (and passenger), Etrich monoplane; Lieut. H. R. P. Reynolds, R.E., Howard Wright biplane; E. Audemars, Blériot monoplane.

Yesterday afternoon, when we went to press, two airmen, namely, "Beaumont" and Védrines, had reached Brooklands, having completed the circuit, and it was announced that the prize had been awarded to "Beaumont." The race was a severe test of the efficiency of aëroplanes and their control by the pilots. The circuit of 1010 miles had to be completed without any airman changing his engine or aëroplane. Five parts in each aëroplane and five in each engine were stamped, and at least two parts in each case had to be in place at the end of the race, the object of the contest being to encourage the construction of trustworthy and enduring flying machines. That it should be possible for airmen to travel over such an extended course of strange country with nothing but maps and compasses to direct them is, however, a remarkable achievement, independent of the capabilities of the aëroplanes. No doubt much experimental data and mathematical investigations will be required before aëroplane architecture can reach the position of naval architecture, but meanwhile aviation engineers and pilots are bringing us nearer that conquest of the air which will be the distinguishing characteristic of the present century; and one of the historic events of this era of aërial navigation will be the trying contest which has just been concluded.

We gather from a circular lately received that a testimonial is contemplated in honour of Sir Patrick Manson, K.C.M.G., F.R.S. The international memorial was an inception by Prof. Blanchard, of the Faculty of Medicine, Paris, and with him are associated the names of men best known in tropical medicine. It was felt, however, that it would ill become Sir Patrick's British *confrères* did they not come forward and show their special appreciation of the work he has done in the field of tropical medicine. The international testimonial is proposed to take the form of a plaquette in gold to be presented to Sir Patrick, and bronze plaquettes to subscribers, to bear an impression of Sir Patrick by a well-known artist. The British testimonial is in the first place to be the presentation of a portrait in oils, of which each subscriber of one guinea and over will receive a black-and-white reproduction; but it is hoped that, in addition, a Manson prize will be founded for bestowal as a reward for good work accomplished in the sphere of tropical medicine and hygiene. Of the success of these testimonials there should be no doubt, for the benefits conferred upon mankind by Sir Patrick Manson as the "father" of modern tropical medicine is incalculable. A new field of scientific investigation has been opened by him; the formulation of the mosquito-malaria theory has had consequences which have extended far beyond even the widely flung malaria, and opened up new channels of thought in every direction. Knowledge of the part played by vermin in the spread of disease is being extended daily as the result of Manson's work, and a new school of thought, giving a fresh direction and impetus to inquiry, has advanced science generally, and will go on bearing fruit so long as time extends.

The organising committee of the Fourth International Conference of Genetics, to be held in Paris on September 18–23, met recently under the presidency of Dr. Viger. M. Philippe de Vilmorin, secretary of the committee, reported what had been done up to that day in preparation for the conference. Not counting the names of the principal French biologists who are members of the committee, the secretary was able to give the names of the following foreigners who have subscribed:—Baur, Giesenhagen, Goldschmidt, Pfitzer, Poll, &c. (for Germany); Agar, Bateson, Darbishire, Gregory, Miss Durham, Hartog, Laxton, Lynch, Nettleship, Paton, Punnett, Miss Saunders, Staples-Browne, Sutton, Miss Wheldale, &c. (for Great Britain); Bradley (for Australia); Fruwirth, Strakosh, Tchermak, &c. (for Austria); W. and Chs. Saunders (for Canada); Johannsen (Denmark); Balls (Egypt); Davenport, Hays, Howard, Swingle, Tower, &c. (United States); Hagedoorn, Houwink, Lotsy, Noordnijn (for Holland); Leake (for India); Strampeli (for Italy); Nilsson-Ehle, Rosenberg (for Sweden); Chodat (Switzerland); Boris de Fedtschenko (Russia); and Arechavaleta (Uruguay). Many universities and scientific societies will be officially represented. Numerous communications have been promised; short descriptions of them will be published before the meeting of the conference, and they will be published in full in the proceedings, a copy of which will be sent to each subscriber. The meetings of the conference will depend upon the number of the communications, but it seems probable that five sittings will be sufficient. The remaining time will be devoted to visits to the Museum of Natural History, the Pasteur Institute at Garches, to Verrières, the laboratories of the Sorbonne, &c. Probably there will be a reception by the French National Society of Horticulture on September 18, and one at the Hôtel de Ville on September 23.

It has been decided to publish from the Sleeping Sickness Bureau a quarterly bulletin dealing with the Leishmania group of diseases. Dr. C. M. Wenyon, protozoologist to the London School of Tropical Medicine, will undertake this part of the work. A list of references is now in preparation and will form the first number.

Reuter's correspondent at Washington announces that on July 24 the Senate ratified the agreement between the United States, Great Britain, and Russia for the suspension of pelagic sealing for fifteen years. An article upon the fur-seal and the convention, which has now been accepted by the United States Senate, appeared in Nature of July 13.

We learn from *Science* that the earthquake of July 1 is reported to have done considerable damage at Lick Observatory, on Mount Hamilton. The 36-inch telescope is said to have been moved three-quarters of an inch out of place on its concrete pier, but was restored without trouble. The case of the Riefler clock was wrecked, and minor damage was done to the working parts. The chimneys of the observatory buildings were injured, and a brick structure which houses a number of astronomers was cracked so as to be unsafe for occupancy.

In the obituary notice of the late Dr. H. Bolus in Nature of June 8, reference was made to "his generous support of the Cape University, which owes to him the foundation of its chair of botany." Prof. H. H. W. Pearson writes to point out that though the establishment of the "Harry Bolus chair of botany in the South African College in 1903 was due in a large measure to the munificent support which Dr. Bolus gave it, there is no botanical chair in the Cape University, which is not a teaching institution."

Referring to the inauguration of a fund to honour the memory of the late M. J. Joubert, to which attention was directed in our last issue (p. 101), we are able to state that an influential committee has been formed, including representatives of the Pasteur Institute, the French Physical Society, and the International Society of Electricians. Joubert's collaboration with Pasteur, his work for the French Physical Society, of which he was once president and for ten years general secretary, and his researches and writings, have all made his name widely known and respected. The idea of founding a Joubert scholarship should appeal to all old colleagues, pupils, and friends of Joubert. Subscriptions may be sent, as has been stated, to M. Gauthier-Villars, 55 quai des Grands-Augustins, Paris.

The present month is establishing a record both for the long and persistent drought and also for its high temperature. In London, July 25 was the twelfth day during the month with the thermometer above 80°, and on two days, July 21 and 22, the temperature exceeded 90°. There has been no temperature in London so high as 90° in July since 1900, and none at any period of the summer since 1906. At some places in the east and south-east of England the thermometer rose higher than in London. In France and Germany the temperature has also been excessive, shade readings of 100° being reported in places. The month was absolutely rainless in London and over the southern portion of England until July 24, when slight rain was experienced, which was followed by a thunderstorm on July 26; so long a period of drought has not occurred in July since 1887.

The recorder of Section C (Geology) of the British Association sends the following statement of the provisional programme for the Portsmouth meeting:—Joint meetings have been arranged with Sections E (Geography) and K (Botany). The subject for discussion with Section E is "The Former Connection of the Isle of Wight with the Mainland," and with Section K, "The Relation of the Present Plant Population of the British Isles to the Glacial Period." Presidential address by Mr. Alfred Harker, F.R.S. The address on the local geology will be delivered by Mr. Clement Reid, F.R.S. The following papers have already been promised:—"On the Discovery of Remains of *Iguanodon bernissartensis* in the Wealden Beds of Brightstone Bay, I. of W., and the adaptation of the pelvic girdle to an erect position and bipedal progression,"

R. W. Hooley. (1) "Siliceous Oolites and other concretionary structures in the vicinity of State College, Pennsylvania," (2) "On the Pre-Cambrian Beds of Ontario," Prof. E. S. Moore, of State College, Pennsylvania. "Further Work in the Silurian Rocks of the Eastern Mendips," Prof. S. H. Reynolds. (1) "On some New Rhætic Fossils from Glen Parva, Leics," (2) "On the Shell-layer in Mollusca," A. R. Horwood.

In *The Times* of July 12 Mr. W. E. Roth, now Commissioner of the Pomeroon district, British Guiana, discusses modern men of the Stone age in New Guinea and North Australia. From a comparison of Mr. Goodbody's account of the strange race found in the hitherto unknown interior of Dutch New Guinea with the natives of North Australia, Mr. Roth comes to the conclusion that the latter are "undoubtedly the more primitive, in that they are nomadic and ignorant of any native fermented drink. They are certainly on a level with regard to the treatment of their women and in their eating human flesh; this, however, can hardly be regarded as true cannibalism, in that all the cases that I have met with in North Queensland were due rather to sentiment and affection, nor, indeed, did I come across a single instance where the individual—man, woman, or child—was purposely killed to be eaten."

Artists and students of anatomy will welcome the elaborate paper entitled "Les proportions du corps pendant la croissance de 13 ans ½ jusqu'à 17 ans ½ ainsi qu'à la naissance, à 6 ans ½ et à 23 ans ½ représentées en milliémes de la taille," published in parts iv.–v., for 1910, of *Bulletins et mémoires de la Société d'anthropologie de Paris.* These series of elaborate measurements of the relations of different parts of the human body are illustrated by statistical diagrams. The memoir is a fine example of the best class of anthropometrical work in which French *savants* have gained a well-merited reputation. Another similar memoir, contributed to the same journal by Drs. Chaillou and Léon Mac-Auliffe, entitled "Le type musculaire," starts with the examination of cerebral characteristics, and passes on to the consideration of living types and sexual variations. The paper deserves study by all who are interested in physical culture. After pointing out the diseases due to the sedentary life, the authors arrive at the conclusion that its hygiene resolves itself into two words—exercise and rest.

In the July issue of *Man*, Messrs. N. F. Robarts and H. C. Collyer continue their report on the excavation of the British camp at Wallington. The numerous loose unbroken flints found on the inner side of the ditch seem to have been used as missiles, and round Tertiary pebbles were employed as sling-stones. A large collection of implements used in the preparation of food was made, the most common, probably because they were the most indestructible, being saddle-back mealing stones, made of the Lower Greensand sandstone. Many tiles, resembling those from the Swiss Lake dwellings, were discovered. Though there were many flakes and cores, stone implements were scanty in number. A broken axe of diorite indicates foreign commerce. Further exploration of the large remaining portion of the ditch will doubtless provide many other similar articles, but the specimens already unearthed are sufficient to give a tolerably clear idea of the civilisation, arts, and industries of the inhabitants of this Surrey town in the first or second century B.C.

We have received a copy of No. 3 of the *Nature Photographer,* which contains excellent photographs of a merlin and her young, and of a group of the tree-fungus known as the "oyster of the woods."

The first part has reached us of a "Lepidopterorum Catalogus," edited by C. Aurivillius and H. Wagner, and published by W. Junk, of Berlin. The catalogue, of which this part deals with the Chrysopolomidæ, purports to give the name of every genus and species, with references.

After financing a natural history collecting expedition to Alaska, Miss A. M. Alexander recently supplied funds for a similar undertaking in Humboldt County, Nevada, which was duly accomplished in the summer of 1909. The results, so far as mammals are concerned, are recorded by Mr. W. P. Taylor in a report issued as No. 7 of the seventh volume of the University of California Zoological Publications. One short-tailed field-mouse is described as new.

Among the more important papers recently published in the Proceedings of the Academy of Natural Sciences of Philadelphia, reference may be made to the third portion of Mr. J. P. Moore's account of the polychætous annelids, dredged off southern California by the *Albatross,* which appeared in the April issue. The number of new forms described indicates the richness of the fauna. Later on in the same issue Messrs. Brown and Pilsbry describe the molluscs of the Tertiary Gatun beds, Isthmus of Panama.

In describing a batch of fourteen newly-born young of an electric ray (*Narcine brasiliensis*) from Florida, Messrs. Bean and Weed point out, in No. 1816 of the Proceedings of the U.S. National Museum, that these differ in colouring from their parents. The young, as shown in a striking plate, are spotted as conspicuously as a leopard, whereas in the adult the spots are much less distinct, and in some cases are formed by the agglomeration of pin-like dots. In No. 1824 of the publication cited, the same authors reclassify the so-called freshwater American sunfishes of the genus Lepomis, belonging to the peccoid family Centrarchidæ. The pharyngeal bones and teeth are largely taken as the basis of classification, and a number of examples of this part of the skeleton are figured.

In an article on the Morocco-Algerian frontier, contributed to the *Field* of July 15, Sir H. H. Johnston reproduces two outline figures of the extinct north African buffalo (*Bos* [*Bubalus*] *antiquus*), incised on rock-faces near Tiout, southern Algeria. The sketches, the age of which is unknown, appear to have been made by a people related to the modern Berbers, but living under conditions similar to those prevalent during the Neolithic or early Metal age in Europe. The horns of the buffalo seem to be of the type of those of the Indian, as distinct from the African, species, and are of immense size. On the other hand, it has been stated that the skeleton, apart from the skull, is more like that of the African buffalo; and the nasal bones appear to be of the short type distinctive of the latter. Sir Harry Johnston states that he was informed by one of the professors at the University of Algiers that other rock-pictures show this buffalo domesticated by a tribe acquainted with the use of metal; a circumstance which renders it all the more remarkable that the species should have become extinct before the time of Carthaginian and Roman history. It may be added that the intermediate characters presented by the extinct Algerian species tend to show that the proposal to separate generically (or subgenerically) the African from the Indian buffalo is unnecessary.

Systematic contributions to the *Kew Bulletin* (No. 5) comprise a list of Balsaminaceæ from the State of Chitral determined by Sir Joseph Hooker, a series of new African euphorbiaceous plants, including a new genus, Cyrtogonone, defined by Dr. Prain and a collection of new exotic fungi described by Mr. G. Massee; of the latter, two species of Balansia, *Æcidium osyridocarpi* and *Ustilago trichopterygis*, are figured, and *Æcidium cymbopogoni* is noted as a destructive pest on lemon grass in the botanic gardens at Entebbe. An article on persimmons, communicated by Mr. W. B. Hemsley, furnishes evidence for separating *Diospyros roxburghii*, a species native to east India and western China, from *Diospyros kaki*.

AN appreciable supplement to what was considered to be a fairly complete list of plants for Monroe County in New York State and adjoining territories, published in 1896, has been issued in the Proceedings of the Rochester Academy of Science (vol. v.). The additions amount to more than two hundred species, of which two-thirds are native and one-third alien. No fewer than seventy-seven of the native species represent determinations made by Dr. Sargent for the genus Cratægus, as this county supplied him with a large number of critical forms; under Viola, eight new native species are scheduled. An alien that was expected and duly arrived along the railroad track is a variety of *Salsola kali*, that receives the name of Russian thistle. *Lysimachia nummularia* is noted as a weed growing on lawns.

THE announcement is made in the May number of *The Indian Forester* that the responsibilities of editorship have been transferred to the president of the Research Institute at Dehra Dun, with whom, as heretofore, a board of management is associated. Among the contents is a concluding article on paper-pulp testing, contributed by Mr. W. Raitt. Dealing with grasses, two new sources are indicated as pulp prepared from "ulla," *Anthisteria gigantea*, and a Burmese consignment of "kaing" grass, *Phragmites karka*, both gave satisfactory results in the matter of colour, strength, and toughness; being in these respects superior to "bhabur," *Ischaemum angustifolium*, that is now worked in the factories. Summarising the prospects of the pulp industry in the United Provinces, the author is of opinion that large reserves of material exist, that ulla, bhabur, and spruce promise to yield the best material, while a number of trees, notably *Bombax malabaricum*, would furnish a pulp of inferior but serviceable quality.

CENTRAL AMERICA is following the excellent example set by the United States in agricultural education, and from Costa Rica we have received the first two numbers of the *Boletin de Fomento*, the organ of the Department of Agriculture. Hevea and coffee naturally come in for a good deal of attention, and sections are devoted to horticulture and agriculture; there is also a geological section. A list of Spanish works on water in relation to agriculture is given, which, though small in comparison with other lists, is much more extensive than one would have expected. The bulletins are well illustrated, and will, we hope, be found to serve a useful purpose.

THE Agricultural Statistics of India for the years 1904–9 are now published in two volumes, vol. i. relating to British India and vol. ii. to the native States. The statistics are not discussed, but are given without comment; for the native States they are not always as accurate as might be desired, but the best available information has been used. For the historian and the administrator these records are invaluable, and all interested in Indian agriculture will find complete *data* as to crops, irrigated and unirrigated areas in the numerous districts, for each of the five years under consideration.

THE growing importance of rice in India has necessitated a careful study of the numerous races cultivated by the natives, and as a preliminary these races have been enumerated in *The Agricultural Ledger* (1910, No. 1). The list is very extensive, and extends over two volumes, each of nearly 300 pages, but it is believed to be as complete as is at present possible. Under each variety is given a very brief description, together with references to papers or books where a fuller account may be found: thus the list is also a guide to the literature. An enormous amount of work has evidently been involved in its preparation, but the authors, Messrs. R. Abbey-Yates and E. F. Vieux, will have the satisfaction of knowing that they have saved subsequent workers much weary searching through literature that is not always easily accessible.

THE report of the Egyptian Survey Department, dated July 3, states that the White and Blue Niles had been rising throughout June at a normal rate, but the level at Wadi Halfa was then 25 cms. below normal, owing to a check in the rains in Abyssinia. The forecast for the Nile flood indicated that it will probably be about 10 per cent. below the average.

The Cairo Scientific Journal for June contains two articles on the silt which is carried and deposited by the flood waters of the Nile, relating especially to the Ibrahimia Canal, one of the great artificial waterways which irrigate Middle Egypt to the north of Assiut. Samples were taken at varying depths, and seemed to show that the scour caused by a bridge unsuitably placed increases the silt which is deposited in the canal downstream of it to a considerable extent. The matter is one of great importance to irrigation in Egypt, and too little attention has hitherto been given to obtaining accurate results, so that the work of Messrs. Bury and Pollard is of definite value.

IN the same number Mr. A. Lucas treats of "hashish," or Indian hemp, *Cannabis indica*, the forms in which it finds its way into Egypt; the manner in which it is consumed, and the methods of detecting it with certainty. Its introduction into Egypt is prohibited, and very large quantities (amounting to 23,000 kilog. in 1909) are seized every year by the Custom House officials and the coastguard officers, but the demand is widespread, and it is obtainable practically in every village. From the number of ways in which this injurious drug is prepared for consumption, in the form of sweetmeats or confections, and the large amount that is still introduced into the country, such investigations are of the highest importance, especially in a country where the adulteration of foods is not controlled, as in Europe.

IN the July number of *Petermann's Mitteilungen*, Dr. Peucker gives an account of the proceedings of the International Aëronautical Conference, held at Brussels on May 26 and 27, in so far as they affected maps. Resolutions were passed in favour of the scale of 1 : 200,000 as far as possible, though in special circumstances other scales might be desirable; each sheet should include a degree square, and the sexagesimal system should be employed; geographical names should be in the language of the country represented. In the compilation of detail and employment of conventional signs full latitude was given, but some delegates expressed the desire that high-tension electric cables should be indicated.

THE Hydrographer's report for 1910 has been issued, containing a brief summary of the surveys which have been carried out by the Admiralty during the year. Five ships were employed in home waters and seven abroad, off

British Columbia, Australia, Borneo, the west, south, and south-east coasts of Africa, the Straits Settlements and Australia, and off Newfoundland. Two ships of the Royal Indian Marine were employed on the Marine Survey of India, off Burma, and the west coast of India. Among much work classed as miscellaneous, a systematic determination of the magnetic variation in the North Sea was carried out in March by the officers of four cruisers, which resulted in obtaining good values at sixty-two positions. Considerable irregularity was also located near the Shetland Islands, and also near the coast of the British Isles. Further experiments were carried out at Chatham with the Field-Cust tide-recording apparatus for use at sea, and very satisfactory results were obtained.

THE Journal of the Meteorological Society of Japan for May contains, in addition to several articles in Japanese on interesting subjects (*e.g.*, "Fogs on the Korean Coast," "Variation of Barometric Pressure in Japan," &c.), original articles in other languages. One of the latter is on "Wireless Telegraphy in the Service of Japanese Meteorology," by Mr. T. Saki. Japan is frequently visited by typhoons, and the most dangerous are those which originate in the Pacific. By arrangements made since May, 1910, the central office at Tokio receives ordinary and special codified radiograms from men-of-war and vessels of the great Japanese shipping companies, from distances even as far off as 180° E. longitude (40° E. of Tokio), and dispatches warning telegrams to ships at sea. These messages will be of great value both for storm-warning purposes and for improving our knowledge of the behaviour of those destructive storms.

IN *Climatological Service* of the U.S. Weather Bureau (District No. 11, California), Prof. A. G. McAdie publishes a paper on forecasting the supply of water for the summer from the depth of snow, which is of considerable interest to engineers, farmers, and others. Observations of the depth of snow and of rainfall have been made since 1870 at Summit, a station on the Southern Pacific Railway, at a height of 7017 feet, where 86 per cent. of the precipitation falls as snow. The average depth of snow (mean of ten seasons), the average rate of its melting, and the depth for the present season, are shown by a diagram. A model (shown in the paper) is also made use of for comparing the actual curve of melting snow for any given season with the mean curve. By means of this design and the tables, the probable date of the snow's disappearance, and the consequent cessation of water supply from this source, may be determined. The author points out that the wind is probably the greatest factor in reducing the depth of snow, and he refers to the difficulty of determining the water equivalent for given depths. The "packing" process plays an important part; samples taken near the top and bottom of a snow bank give very different results.

DR. H. A. MIERS, F.R.S., principal of London University, delivered the eighteenth Robert Boyle lecture before the Oxford University Junior Scientific Society on May 20, and selected as his subject the growth of a crystal. The lecture has just been issued by Mr. Henry Frowde, price 1*s.* net. To the elucidation of the problem of crystallisation nearly the whole of the researches which Dr. Miers had carried on with the aid of a small but zealous band of students during his tenure of the Waynflete chair of mineralogy at Oxford had been devoted, and his lecture, therefore, took largely the form of a valedictory address, in which he recounted the nature of those researches and summed up the progress made in our comprehension of the constitution of crystallised matter as the result of them. Dr. Miers had early realised that mere idle speculation was futile, and that it was of primary importance to observe a crystal while actually growing, and had devised for the purpose apparatus which he brought with him to Oxford; with it he made the interesting discovery that the layer immediately in contact with the crystal is denser than the liquid as a whole. In conjunction with Miss Isaac he investigated the conditions governing crystallisation from a saturated solution, and at his instigation Mr. Barker studied the growth of one crystallised substance on another, and found that congruence of molecular structure was the factor that determined parallelism of growth. Dr. Miers referred to Prof. Lehmann's discovery of liquid crystals, and to the theory of crystal structure put forward by Mr. Barlow and Prof. Pope, and, in conclusion, pointed out that advance in a subject such as crystallisation, which lay near the confines of several branches of science, depended to no small extent upon the assistance of other workers beyond the fence.

UNDER the title "Men of Note in Aëronautics," the July issue of *Aëronautics* gives a biographic notice of Mr. R. F. Macfie which should do much good in bringing home to English readers the side of aviation to which little attention is given in daily papers. The extracts from Mr. Macfie's diary will, indeed, be a revelation to the uninitiated reader of the difficulties encountered by the early pioneers of artificial flight, which include destruction of aëroplanes, repeated interviews with War Office officials, followed by refusal of permission to fly, delays of three days at Custom houses, permission refused at Pau after having previously been granted, interviews with municipal authorities resulting in further refusals, loss of machine in transit, its recovery in a terrible state of ruin, delay in sending engines, short flights, then permission withdrawn, machine damaged by bad weather, then partially burnt. In spite of the present popular enthusiasm, there are many workers in aviation who not only do not receive the recognition they deserve, but are, on the contrary, handicapped by every kind of discouragement.

THE Circolo Matematico di Palermo is a society which during the twenty-seven years that have elapsed since its foundation in 1884, has gradually developed into an international mathematical society. It is interesting to note how different nationalities were represented at the time when its last report, for 1910, was drawn up. Out of a total of 745 members, we find that the countries contributing not fewer than 10 members may be classified as follows:—Italy, 275; United States, 119; Germany, 111; France and colonies, 54; Austro-Hungary, 49; Russia, 24; Great Britain and Ireland, 17; Sweden, 16; Denmark, 13; Belgium and Switzerland, each 11. The membership for the whole British Empire, including India, only numbers 24, the same as for Russia. It need scarcely be pointed out that the large preponderance of Italian members is in great measure attributable to the local character of the society, but leaving the figures for Italy out of account, the remaining statistics may afford some indications of the relative importance attached by different countries to an international movement for the advancement of higher mathematics.

THE annual report of the Royal Prussian Meteorological Institute ("Bericht über die Tätigkeit des königlich Preussischen Meteorologisches Instituts, 1910") has been issued. The administrative report shows that satisfactory progress has been maintained with routine work both at the institute and at the Potsdam Observatory. A number of scientific papers by members of the staff or by observers in connection with the institute are printed as appendices. Several of these deal with questions of thermometer and rain-gauge exposure. Among the remaining papers we may mention a detailed summary of the observations of cloud motion over Hildesheim, extending over the period 1904–8, by Th. Bötel, observer at Hildesheim, and a report by W. König of the heavy rainfall experienced in Germany during the first few days of August, 1910. Appendix xi. reports on the comparison of the standard barometers and magnetic instruments of Potsdam Observatory with those of de Bilt, Paris, Val Joyeux, and Pavlovsk, carried out by Dr. W. Kühl in conformity with resolutions of the International Meteorological Committee. Further papers on magnetic comparisons are contributed by Prof. Ad. Schmidt and Dr. O. Venske. Prof. Schmidt also contributes a paper on the detailed magnetic survey of east Prussia, a region of great magnetic disturbance. This is accompanied by a chart of isogonic lines for the epoch 1911·0

IF the collimator and telescope of a spectrometer are so placed that their axes coincide, and a block of plane parallel glass is placed between the collimator lens and the telescope lens, no deviation of the image of the collimator slit is produced. If the upper part of the glass block is provided with a prism-shaped cavity which contains a liquid having an index of refraction which differs from that of the block, the upper part of the image of the slit will be deviated by an amount proportional to the difference of the two indices of refraction. Now the deviation of a narrow pencil of homogeneous light on passing through a lens is proportional to the distance of the point of the lens on which the pencil falls from the axis of the lens. By making the light which has passed through the liquid pass through a lens at the proper distance from the axis, the deviation due to the liquid may therefore be compensated. It is on this principle that the Féry refractometer is constructed. The block of glass containing the prism-shaped hollow for the liquid the index of refraction of which is required, is enclosed in a small water tank the sides of which are plane convex lenses. The tank and contents can be moved horizontally across the field by means of a screw, and the distance through which they have to be moved to make the resultant deviation zero, is found to be proportional to the difference of refractive indices of glass and liquid. In the instrument as constructed by Messrs. Hilger, the range of refractive index is from 1·3300 to 1·6700, with a degree of accuracy of nearly 0·0001. The reading is direct, and by heating the water in the tank to different temperatures the effect of temperature on the index of the liquid may be determined. A measurement can be obtained with 1 c.c. of liquid.

THE second issue of *Le Monde*, which is described as a monthly illustrated encyclopædia, being an anthology of the reviews of all countries, has reached us. Copies may be obtained in this country from Messrs. Nilsson and Co., 16 and 18 Wardour Street, London, W., at the price of three francs. Among other contributions to this issue we notice translations into French of Mr. H. H. Suplee's article in *Cassier's Magazine* on the determination of altitudes reached by aëroplanes, and an article from *The Times* on the great ocean liners which now connect Europe and America.

WE have received from Prof. C. Ulpiani a reprint of a paper from the *Atti della Società Italiana per il Progresso delle Scienze*, 1910, discussing the work of the United States Bureau of Soils, especially the applications of physical chemistry to the soil.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES FOR AUGUST:—

Aug. 1. 7h. 11m. Jupiter in conjunction with the Moon (Jupiter 1° 13′ N.).
7. 22h. 46m. Uranus in conjunction with the Moon (Uranus 4° 28′ N.).
8. 18h. 0m. Mars at quadrature to the Sun.
10. 1h. 0m. Venus at greatest brilliancy.
10–12. Maximum of the Perseid Meteors.
12. 21h. 0m. Mercury at greatest elongation E.
13. 6h. 0m. Saturn at quadrature to the Sun.
16. 15h. 53m. Mars in conjunction with Saturn (Mars 0° 21′ N.).
16. 20h. 2m. Saturn in conjunction with the Moon (Saturn 4° 2′ S.).
16. 20h. 12m. Mars in conjunction with the Moon (Mars 3° 40′ S.).
19. 19h. 0m. Venus in Aphelion.
21. 1h. 20m. Neptune in conjunction with the Moon (Neptune 5° 36′ S.).
22. 14h. 0m. Venus stationary.
25. 11h. 50m. Venus in conjunction with the Moon (Venus 10° 23′ S.).
28. 22h. 0m. Jupiter in conjunction with the Moon (Jupiter 1° 41′ N.).

DISCOVERY OF ANOTHER COMET (1911*c*).—A telegram from the Kiel Centralstelle announces the discovery of a comet at the Geneva Observatory (U.S.A.) on July 20. At 9h. 52m. (Geneva M.T.) the comet's position was

R.A. 22h. 13·6m., dec. 20° 57′ N.,

and it was moving in a north-westerly direction. A second observation was made on July 21 at the Lick Observatory, and at 9h. 53·1m. (Lick M.T.) the position was

R.A. 22h. 13m., dec. 21° 34′ 40″ N.

This position precedes the Great Square, and forms, roughly, an equilateral triangle with α and β Pegasi; it transits at about 1 a.m. According to the Lick observers, the comet was of about the tenth magnitude, and was moving in a N.N.W. direction.

THE KIESS COMET, 1911*b*.—A number of observations of comet 1911*b* appear in No. 4512 of the *Astronomische Nachrichten*, where the magnitude is variously recorded with values varying from 4·0 to 8·5. The object is blue or green, and has a faint tail, which on a photograph taken at Simeïs on July 9 was 0·5° long, in position angle 285°.

Later observations have made it possible for Dr. Kobold to improve his elements and obtain an ephemeris which practically agrees with the observations; these he publishes in a supplement to No. 4513 of the *Astronomische Nachrichten*.

Ephemeris (12h. M.T. Berlin).

1911	α (true) h. m.	δ (true)	log r	log Δ	mag.
July 26	4 15·0	+30 3·3			
,, 28	4 9·9	+28 57·7	9·9515	9·8582	5·8
,, 30	4 4·2	+27 40·2			
Aug. 1	3 57·5	+26 3·5	9 9755	9·7742	5·4
,, 3	3 49·7	+24 5·6			

Perihelion occurred on June 30, so that the comet is now receding from the sun; but it is approaching the earth, and later, in August, will come within 0·2 of an astronomical unit. It should then provide a striking spectacle, especially to those situated in the southern hemisphere, in the early morning sky. At present its calculated magnitude is about 6·0, but when nearest the earth the comet should increase in brightness to about magnitude 3·5. The present position lies about half-way between ι Aurigæ and the Pleiades, and on August 3–4 the comet should be very near to the latter asterism.

WOLF'S COMET, 1911*a*.—Observations of this faint comet are recorded in No. 4512 of the *Astronomische Nachrichten*. M. Javelle, observing at Nice on July 5, found it to be a star-like object of less than magnitude 14·0, having a faint nebulosity about it. M. Kamensky finds that the correction to his ephemeris is about −0·5s. and −6·3″, and asks observers to communicate their positions to him.